

ECE-300, Quiz #4

1) The integral $\int_{-\infty}^{\infty} u(t+1)u(t-2)e^{-t} dt$ can be simplified as

a) $\int_{-1}^{\infty} e^{-t} dt$ b) $\int_{-2}^{\infty} e^{-t} dt$ c) $\int_{-1}^2 e^{-t} dt$ d) none of these

2) The integral $\int_{-\infty}^{\infty} u(-1-\lambda)e^{-|\lambda|} d\lambda$ can be simplified as

a) $\int_{-\infty}^{-1} e^{-|\lambda|} d\lambda$ b) $\int_{-1}^{\infty} e^{-|\lambda|} d\lambda$ c) $\int_1^{\infty} e^{-|\lambda|} d\lambda$ d) none of these

3) The integral $\int_{-\infty}^{\infty} u(t-\lambda-1)\delta(\lambda+1)d\lambda$ can be simplified as

a) 1 b) 0 c) $u(t)$ d) $u(t-2)$

4) Assume that at some point in determining the convolution of two functions we end up with an integral of the following form

$$\int_{-2}^{t-1} \dots d\lambda$$

Once we have evaluated this integral, we need to append which of the following functions to indicate that the integral is only nonzero for a certain range of t

a) $u(t)$ b) $u(t-1)$ c) $u(t+2)$ d) $u(t+1)$ e) $u(t-3)$

5) Assume the impulse response for an LTI system is $h(t) = 2\delta(t) - 3\delta(t-1)$. If the input to the system is $x(t)$, the output can be best represented as

a) $y(t) = 2u(t) - 3u(t-1)$ b) $y(t) = 2x(t) - 3x(t-1)$
 c) $y(t) = x(t)[2\delta(t) - 3\delta(t-1)]$ d) $y(t) = 2x(0)\delta(t) - 3x(1)\delta(t-1)$

6) Assume the impulse response for an LTI system is $h(t)$. If the input to the system is $x(t) = 3\delta(t+1)$, the output can be best represented as

a) $y(t) = 3h(t+1)$ b) $y(t) = 3h(-1)\delta(t+1)$ c) $y(t) = 3h(t)\delta(t+1)$ d) $y(t) = 3h(t)u(t+1)$

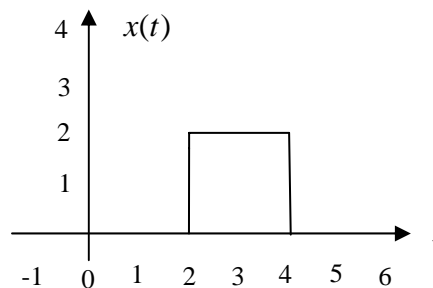
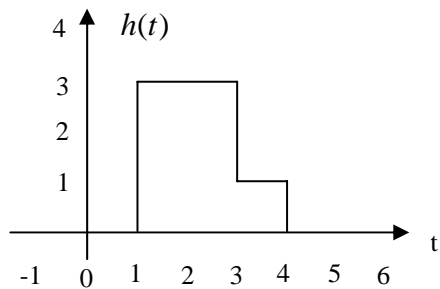
Problems 7-9 refer to an LTI system with impulse response $h(t) = e^{-t}u(t-1)$.

7) Is this system BIBO stable? a) Yes b) No

8) Is this system causal? a) Yes b) No

9) Is this system memoryless? a) Yes b) No

Problems 10 -14 refer to the following linear time invariant (LTI) system, with impulse response $h(t)$ shown below on the left, and input $x(t)$ shown below on the right. The output of the system, $y(t)$, is the convolution of the impulse response with the input, $y(t) = h(t) * x(t)$.



10) Is this LTI system causal?

a) Yes b) No

11) Is this LTI system BIBO stable?

a) Yes b) No

12) The maximum value of $y(t)$ is

a) 4 b) 5 c) 6 d) 12 e) 14

13) $y(t)$ is zero until what time?

a) 0 b) 1 c) 2 d) 3 e) 4

14) $y(t)$ will return to zero at what time?

a) 6 b) 7 c) 8 d) 9 e) 10